Information Update

Guidelines For Estimating ALFALFA SEED Cost of Production

DATE: July, 1992

This guide is designed to provide planning information and a format for calculating costs of production in an Alfalfa Seed enterprise using leafcutting bees.

It was developed from information provided by Manitoba Agriculture staff working closely with producers who have experience in alfalfa seed production utilizing leafcutting bees.

A number of assumptions are defined in the document. For those not familiar with this enterprise, default data may be used. Each assumption must be examined and individual adjustments made where necessary to reflect new situations.

This budget is not necessarily a representative sample of the cost of production for the Manitoba industry. It is simply a production guide used to assist those who would like to project their own cost of production.

MG-15396

ALFALFA SEED COST OF PRODUCTION (Per Hectare)

A. OPERATING COSTS	Seeding Year (1)	Average Cost (2)	Total	Your Farm
1.01 Seed	$ 28.84	$ 0.00	$ 28.84	
1.02 Fertilizer	15.40	0.00	15.40	
1.03 Herbicides	35.94	111.83	371.43	
1.04 Insecticides	0.00	46.33	139.00	
1.05 Machinery	65.45	36.50	174.95	
1.06 Crop Insurance	5.56	27.92	89.32	
1.07 Field Inspection	0.00	3.59	10.77	
1.08 Roguing	0.00	12.00	36.00	
1.09 Pollination	0.00	29.45	88.35	
1.10 Miscellaneous	5.00	12.35	42.05	
Subtotal Operating	156.19	279.97	996.11	
1.11 Interest on Operating	7.81	14.00	49.81	
TOTAL OPERATING COSTS	$164.00	$293.97	$1,045.92	
B. FIXED COSTS				
2.01 Land Investment Costs	$ 64.25	$ 64.25	$ 257.00	
2.02 Depreciation	33.60	33.60	134.40	
2.03 Investment (other capital)	22.56	22.56	90.24	
2.04 Pollination	0.00	106.00	318.00	
TOTAL FIXED COSTS	$120.41	$226.41	$ 799.64	
C. LABOUR				
3.01 Alfalfa	$ 40.00	$ 29.60	$ 128.80	
3.02 Leafcutting Bees	0.00	34.56	103.68	
TOTAL LABOUR COSTS	$ 40.00	$ 64.18	$ 232.54	
TOTAL COST OF PRODUCTION	**$324.41**	**$584.56**	**$2,078.10**	
Flax Income	$206.25	$ 0.00	$ 206.25	
Bee Income	$ 0.00	$ 83.33	$ 250.00	
NET TOTAL COST			$1,621.85	
Total Yield (see table on page 4)			1,065 kg	

Breakeven Cost Analysis (Alfalfa Seed)		
Operating Costs (less flax income)	$0.79/kg	
Operating Costs (less flax & bee income)	$0.55/kg	
Net Total Costs (less flax & bee income)	$1.52/kg	

(1) Seeding Year is the year alfalfa crop is established.
(2) Average Cost is the average for the 3 Cropping Years.

ALFALFA SEED COST OF PRODUCTION (Per Acre)

A. OPERATING COSTS	Seeding Year (1)	Average Cost (2)	Total	Your Farm
1.01 Seed	$ 11.50	$ 0.00	$ 11.50	
1.02 Fertilizer	6.35	0.00	6.35	
1.03 Herbicides	14.55	45.27	150.36	
1.04 Insecticides	0.00	18.77	56.30	
1.05 Machinery	26.50	14.75	70.75	
1.06 Crop Insurance	2.25	11.30	36.15	
1.07 Field Inspection	0.00	1.44	4.32	
1.08 Roguing	0.00	5.00	15.00	
1.09 Pollination	0.00	11.90	35.70	
1.10 Miscellaneous	2.00	5.00	17.00	
Subtotal Operating	63.15	113.43	403.43	
1.11 Interest on Operating	3.16	5.67	20.17	
TOTAL OPERATING COSTS	$ 66.31	$119.10	$423.60	
B. FIXED COSTS				
2.01 Land Investment Costs	$ 26.00	$ 26.00	$104.00	
2.02 Depreciation	13.60	13.60	54.40	
2.03 Investment (other capital)	9.12	9.12	36.48	
2.04 Pollination	0.00	42.40	127.20	
TOTAL FIXED COSTS	$ 48.72	$ 91.12	$322.08	
C. LABOUR				
3.01 Alfalfa	$ 16.00	$ 12.00	$ 52.00	
3.02 Leafcutting Bees	0.00	14.00	42.00	
TOTAL LABOUR COSTS	$ 16.00	$ 26.00	$ 94.00	
TOTAL COST OF PRODUCTION	**$131.03**	**$236.22**	**$839.68**	
Flax Income	$ 84.00	$ 0.00	$ 84.00	
Bee Income	$ 0.00	$ 33.33	$100.00	
NET TOTAL COST			$655.68	
Total Yield (see table on page 4)			950 lbs	

Breakeven Cost Analysis (Alfalfa Seed)		
Operating Costs (less flax income)	$0.36/lb	
Operating Costs (less flax & bee income)	$0.25/lb	
Net Total Costs (less flax & bee income)	$0.69/lb	

(1) Seeding Year is the year alfalfa crop is established.
(2) Average Cost is the average for the 3 Cropping Years.

ASSUMPTIONS

1. Field is initially free of perennial weeds.
2. Proprietary contract (private variety).
3. Production based on four (4) year rotation.
4. Assumed 80 ha (200 ac) of alfalfa seed production.
5. Leafcutting bee operation is based on 50,000 bees/ha (20,000 bees/ac).
6. Seeding Year is also referred to as Establishment Year.
7. Estimated yield was assumed as follows:

Estimated Yield

Years	Kilograms/Hectare	Pounds/Acre
1	0	0
2	395	350
3	335	300
4	335	300
Total	1,065	950
Average	266	238

Flax Income (Seeding Year)

It was estimated that the flax nurse crop would reduce the total cost over the four years giving a potential yield of 750 kg/ha [12 (bu/ac) at a price of $275.00/tonne ($7.00/bu) for a total of **$206.25/ha ($84.00/ac)**].

Bee Income

Assuming a 1.5 - fold return in bees for 2 of the 3 production years, the average income over 3 years would be as follows:

	Hectare	**Acre**
Saleable Bees (number)	25,000/ha	10,000/ac
Expected price/bee	$ 0.005	$ 0.005
Expected Income	$125.00	$ 50.00
Total Income	**$250.00**	**$100.00**
Average Income (cropping years)	**$ 84.00**	**$ 33.33**

WORKSHEET

A. OPERATING COSTS

1. Seed

	Hectare	Acre	Your Farm
Alfalfa			
Rate	1.12 kg/ha	1.00 lbs/ac	_____
Cost/Unit	$18.00 /kg	$ 8.00 /lb	_____
Total Alfalfa Seed Cost	$20.16	$ 8.00	_____
Flax			
Rate	28 kg/ha	25 lbs/ac	_____
Cost/Unit	$ 0.31 /kg	$ 0.14 /lb	_____
Total Flax Seed Cost	$ 8.68	$ 3.50	_____
Seeding Year (Total)	**$28.84**	**$11.50**	_____

2. Fertilizer

Fertilizer (11-52-0) was only applied in the seeding year.

	Hectare	Acre	
Rate	55 kg/ha	50 lbs/ac	_____
Cost/Unit	$0.28 /kg	$0.127 /lb	_____
Seeding Year (Total)	**$15.40**	**$ 6.35**	_____

3. Herbicide **Your Farm**

Herbicides to be used in an alfalfa seed field vary according to weed population and weed spectra. The cost of your chemical weed control program may be lower if weed populations do not warrant treatment. Consult the Guide to Chemical Weed Control, published by Manitoba Agriculture, for specific recommendations regarding chemical usage.

	$/Hectare	**$/Acre**	
Seeding Year	**$ 35.94**	**$ 14.55**	_____
Cropping Years:			
1st Cropping	$148.77	$ 60.23	_____
2nd Cropping	11.52	4.66	_____
3rd Cropping	175.20	70.93	_____
Total Cropping Years (3)	$335.49	$135.82	_____
Average Cost	**$111.83**	**$ 45.27**	_____
Total (4 years)	**$371.43**	**$150.36**	_____

4. Insecticide

Includes application costs of $3.70/ha ($1.50/ac) for Dimethoate and $8.65/ha ($3.50/ac) for Dylox.

Insecticide applied in cropping years only.

	$/Hectare		**$/Acre**		
Cropping Years:	Dimethoate	Dylox	Dimethoate	Dylox	
1	$ 21.20	$37.70	$ 8.60	$ 15.25	_____
2	21.20	0.00	8.60	0.00	_____
3	21.20	37.70	8.60	15.25	_____
Total Cost/Chemical	$ 63.60	$ 75.40	$ 25.80	$ 30.50	_____
Average Cost	**$ 46.33**		**$ 18.77**		_____
Total (3 years)	**$139.00**		**$ 56.30**		_____

5. Machinery

Machinery operating consists of fuel plus maintenance and repairs.

	$/Hectare		$/Acre		Your Farm
	Seeding	Cropping	Seeding	Cropping	
Fuel	$ 44.45	$ 23.50	$ 18.00	$ 9.50	_____
Maint. & Repairs	21.00	13.00	8.50	5.25	_____
Annual Cost	**$ 65.45**	**$ 36.50**	**$ 26.50**	**$ 14.75**	_____
Total	**$174.95**		**$ 70.75**		_____

6. Crop Insurance (e.g. risk area #15)

Crop insurance for pedigreed alfalfa seed production is based on individual coverage. In this budget, crop insurance is purchased for establishing and producing alfalfa based upon risk area #15 (MCIC).

Seeding year:

Premium is calculated by multiplying premium rate times dollar coverage.
0.05 x $45 - $2.25/acre ($5.56/hectare)

Cropping years:

Insurance coverage at 80% is assumed at 0.080 tonnes/acre or 176 lbs/acre. Dollar value coverage for pedigreed alfalfa seed for 1992 is set at $1,430/tonne or $0.65/pound.

Premium is calculated by multiplying the insurance factor for pedigreed seed by the dollar value coverage.
0.0079 x $1,430 = $11.30/acre ($27.92/hectare)

	$/Hectare	$/Acre	
Seeding Year	**$ 5.56**	**$ 2.25**	_____
Average Cost	**$ 27.92**	**$ 11.30**	_____
Total	**$ 89.32**	**$ 36.15**	_____

7. Field Inspection

Total land base assumed at 80 hectares (200 acres).		Your Farm
Basic Fee	$ 50.00	_____
Variety Fee	15.00	_____
Assessment Fee ($2.35/ha; $0.95/ac)	190.00	_____
Branch Fee ($0.40/ha; $0.16/ac)	32.00	_____
Total Annual Field Inspection Cost	$287.00	_____

	$/Hectare	$/Acre	
Average Cost	**$ 3.59**	**$ 1.44**	_____
Total	**$ 10.77**	**$ 4.32**	_____

8. Roguing

Roguing is the process of physically removing undesirable plants and/or weeds that have escaped the normal weed control program.

	$/Hectare	$/Acre	
Average Cost	**$ 12.00**	**$ 5.00**	_____
Total	**$ 36.00**	**$ 15.00**	_____

9. Pollination (Cropping Years)

The leafcutting bee operation is capable of pollinating 80 hectares (200 acres); the initial bee investment includes 50,000 bees/hectare (20,000 bees/acre) purchased at $0.005 per bee.

Operating Costs	**$/Hectare**	**$/Acre**	**Your Farm**
Hydro	$ 2.60	$ 1.05	_____
Fuel	2.85	1.15	_____
Buildings Repairs	3.45	1.40	_____
Equipment Repairs	4.70	1.90	_____
Insurance			
Bees	3.35	1.35	_____
Equipment	3.35	1.35	_____
Decontamination	1.75	0.70	_____
Cocoon Testing	1.00	0.40	_____
Miscellaneous	6.40	2.60	_____
Average Cost	**$ 29.45**	**$ 11.90**	_____
Total (3 years)	**$ 88.35**	**$ 35.70**	_____

10. Miscellaneous

Overhead expenses such as telephone, office supplies, accounting and bookkeeping, etc. were estimated for the seeding and cropping years.

	$/Hectare	**$/Acre**	
Seeding Year	**$ 5.00**	**$ 2.00**	_____
Average Cost	**$ 12.35**	**$ 5.00**	_____
Total	**$ 42.05**	**$ 17.00**	_____

11. Interest On Operating

Interest on operating was calculated on the average operating cost (1/2) multiplied by an interest rate equal to current operating loan rates. Current rates were assumed at 10%.

	$/Hectare		$/Acre		Your Farm
	Seeding	Cropping	Seeding	Cropping	
Subtotal Op. Costs	$156.19	$279.97	$ 63.15	$113.43	_____
Divided by 2 =	78.10	139.99	31.58	56.72	_____
Annual Cost	**7.81**	**14.00**	**3.16**	**5.67**	_____
Total	**$ 49.81**		**$ 20.17**		_____

B. FIXED COSTS:

2.01 Land Investment Cost

Land values per hectare were based on the last 3 years average land value for the Province. Assuming 8% opportunity cost.

	$/Hectare	$/Acre	
Land Value	$803.00	$325.00	_____
Seeding Year	**$ 64.25**	**$ 26.00**	_____
Average Cost	**$ 64.25**	**$ 26.00**	_____
Total	**$257.00**	**$104.00**	_____

2.02 Depreciation

It was assumed that machinery, equipment and storage facilities were of the same compliment as a grain farm. It was also assumed that machinery and equipment averaged **$370/hectare ($150/acre)** and storage averaged **$100/hectare ($40/acre).**

To calculate this portion of the fixed costs it was assumed that salvage value was **20%** of the original value.

Useful life varied from **10 years** for machinery and equipment to **20 years** for storage facilities.

Depreciation Formula:

$$\frac{OriginalCost - SalvageValue}{UsefulLife}$$

	$/Hectare	$/Acre	
Machinery & Equipment	$ 29.60	$ 12.00	_____
Storage	$ 4.00	$ 1.60	_____
Annual Cost	**$ 33.60**	**$ 13.60**	_____
Total	**134.40**	**$ 54.40**	_____

2.03 Investment (other capital)

The opportunity cost interest rate used on machinery, equipment and storage was 8%.

Investment Cost Formula:

$$\frac{OriginalCost + SalvageValue}{2} \times InvestmentRate$$

	$/Hectare	$/Acre	
Annual Cost	**$ 22.56**	**$ 9.12**	_____
Total	**$ 90.24**	**$ 36.48**	_____

2.04 Pollination

Leafcutting Bee Investment Schedule

	Initial Cost	Salvage Value	Useful Life	Per Hectare		Per Acre	
				Dep'n	Invest	Dep'n	Invest
Shelters	$ 6,700	$1,340	10	$ 6.70	$ 4.02	$ 2.68	$ 1.61
Nests	18,500	3,700	10	18.50	11.10	7.40	4.44
Inc. Trays	2,400	480	10	2.40	1.44	0.96	0.58
Cooler & Comp.	3,300	660	10	3.30	1.98	1.32	0.79
Cell Remover	3,800	760	10	3.80	2.28	1.52	0.91
Cell Breaker	1,800	360	10	1.80	1.08	0.72	0.43
Other Equip.	2,000	400	10	2.00	1.20	0.80	0.48
Building	12,000	2,400	20	6.00	7.20	2.40	2.88
Truck & Trailer	7,000	1,400	10	7.00	4.20	2.80	1.68
Bees	20,000	---	---	0.00	20.00	0.00	8.00
Average Cost				**$106.00**		**$ 42.40**	
Total				**$318.00**		**$127.20**	

Assumptions:

Shelters — Bee shelters are placed on the fields at a rate of 1 shelter/1.2 ha (1 shelter/3 ac). Standard bee shelters (4' x 4' x 8' plywood const.) are valued at $100 each. A minimum of 67 shelters are required.

Bees — Leafcutting bees are placed out on the alfalfa fields at a rate of 50,000 bees/ha (20,000 bees/ac). Assuming a 33% female ratio in the bee population, there would be approximately 20,000 female bees/shelter.

Nests — Polystyrene nesting material was decided upon for use in this operation. The style of nest box chosen accommodates 200 polystyrene grooved boards, or 6,000 tunnels per nest. Allowing 1.5 tunnels/female, 5 of these nests will be required per shelter. Recognizing the fact that some breakage of the nest boards will occur (eg. during cell removal), an annual replacement cost equal to 10% of the nests' value was added. A minimum of 335 nests are required at a cost of $55 per nest.

Incubation Trays — Incubation trays, each having a 30,000 cocoon capacity are valued at $15 per tray. A minimum of 134 trays are required (2 trays/shelter for 67 shelters). Also, an additional $400 is included for racks to hold the trays during incubation.

Other Equipment — This includes the costs of heaters, humidifiers, dehumidifiers, black lights (parasite control), fans, an alarm system and a cell tumbler.

C. LABOUR COSTS

3.01 Alfalfa

Labour cost was assumed to be valued at $8/hour.

	Hectare		Acre		Your Farm
	Seeding	Cropping	Seeding	Cropping	
Hours	5	3.7	2	1.5	_____
Rate	$ 8.00	$ 8.00	$ 8.00	$ 8.00	_____
Average Cost	**$ 40.00**	**$ 29.60**	**$ 16.00**	**$ 12.00**	_____
Total	**$128.80**		**$ 52.00**		_____

2.04 Pollination

Leafcutting Bee Investment Schedule

	Initial Cost	Salvage Value	Useful Life	Per Hectare		Per Acre	
				Dep'n	Invest	Dep'n	Invest
Shelters	$ 6,700	$1,340	10	$ 6.70	$ 4.02	$ 2.68	$ 1.61
Nests	18,500	3,700	10	18.50	11.10	7.40	4.44
Inc. Trays	2,400	480	10	2.40	1.44	0.96	0.58
Cooler & Comp.	3,300	660	10	3.30	1.98	1.32	0.79
Cell Remover	3,800	760	10	3.80	2.28	1.52	0.91
Cell Breaker	1,800	360	10	1.80	1.08	0.72	0.43
Other Equip.	2,000	400	10	2.00	1.20	0.80	0.48
Building	12,000	2,400	20	6.00	7.20	2.40	2.88
Truck & Trailer	7,000	1,400	10	7.00	4.20	2.80	1.68
Bees	20,000	---	---	0.00	20.00	0.00	8.00
Average Cost				**$106.00**		**$ 42.40**	
Total				**$318.00**		**$127.20**	

Assumptions:

Shelters — Bee shelters are placed on the fields at a rate of 1 shelter/1.2 ha (1 shelter/3 ac). Standard bee shelters (4' x 4' x 8' plywood const.) are valued at $100 each. A minimum of 67 shelters are required.

Bees — Leafcutting bees are placed out on the alfalfa fields at a rate of 50,000 bees/ha (20,000 bees/ac). Assuming a 33% female ratio in the bee population, there would be approximately 20,000 female bees/shelter.

Nests — Polystyrene nesting material was decided upon for use in this operation. The style of nest box chosen accommodates 200 polystyrene grooved boards, or 6,000 tunnels per nest. Allowing 1.5 tunnels/female, 5 of these nests will be required per shelter. Recognizing the fact that some breakage of the nest boards will occur (eg. during cell removal), an annual replacement cost equal to 10% of the nests' value was added. A minimum of 335 nests are required at a cost of $55 per nest.

Incubation Trays — Incubation trays, each having a 30,000 cocoon capacity are valued at $15 per tray. A minimum of 134 trays are required (2 trays/shelter for 67 shelters). Also, an additional $400 is included for racks to hold the trays during incubation.

Other Equipment — This includes the costs of heaters, humidifiers, dehumidifiers, black lights (parasite control), fans, an alarm system and a cell tumbler.

C. LABOUR COSTS

3.01 Alfalfa

Labour cost was assumed to be valued at $8/hour.

	Hectare		Acre		Your Farm
	Seeding	Cropping	Seeding	Cropping	
Hours	5	3.7	2	1.5	_____
Rate	$ 8.00	$ 8.00	$ 8.00	$ 8.00	_____
Average Cost	**$ 40.00**	**$ 29.60**	**$ 16.00**	**$ 12.00**	_____
Total	**$128.80**		**$ 52.00**		_____

3.02 Leafcutting Bees

In determining the labour costs for the leafcutting bee enterprise the following activities were considered:

1. Spring site-work
2. Installation
3. Summer inspection
4. Winter storage

For this size of enterprise 350 hours or 4.3 hours/hectare (1.75 hours/acre) was considered sufficient.

	Hectare	**Acre**	
Hours	4.32	1.75	_____
Rate	$ 8.00	$ 8.00	_____
Average Cost	**$ 34.56**	**$ 14.00**	_____
Total	**$103.68**	**$ 42.00**	_____

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FOR FURTHER INFORMATION CONTACT YOUR LOCAL AGRICULTURAL OFFICE.